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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,829	11/12/2003	Timothy L. Lambert	0204-PA	8833

7590 03/21/2007  
CROMPTON CORPORATION  
Benson Road  
Middlebury, CT 06749

EXAMINER
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BOYER, RANDY

ART UNIT	PAPER NUMBER
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1764

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/21/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/712,829	LAMBERT ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Randy Boyer	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

1. Examiner acknowledges response filed 29 January 2007 containing new claims 11-20, and remarks.
2. The rejections of claims 1-10 under 35 U.S.C. 103(a) are maintained, and the newly added claims 11-20 are also rejected under 35 U.S.C. 103(a). The rejections follow.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-20 are rejected under 103(a) as being unpatentable over Wettling (US 2003/0162918) in view of Ishikawa (US 3567795).

7. With respect to claim 1, Wettling discloses a process for catalyst deactivation of a crude polyolefin polymerized in the presence of a boron trifluoride catalyst whereby the crude polyolefin is washed with water (see Wettling, page 4, paragraph 62), the aqueous and organic phases are separated (see Wettling, page 4, paragraph 62), an aluminum oxide adsorbent (deactivator) is added to the organic phase to form a slurry (see Wettling, page 4, paragraph 54), the slurry is heated (see Wettling, page 5, paragraph 75), and the adsorbent is separated from the organic phase (see Wettling, page 5, paragraph 75).

Wettling does not disclose a process step for heating the slurry solution under reduced pressure.

However, Ishikawa discloses a process of eliminating an aluminum chloride polymerization catalyst from polymerization products whereby sodium silicate is brought

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into contact with a crude polymer solution and heated under conditions of reduced pressure so as to reduce the halogen content of such solution (see Ishikawa, column 5, lines 16-18). Furthermore, it is known in the art that a stripping operation to remove halogen impurities can be enhanced by carrying out such operation at conditions of reduced pressure (see, e.g., Huang, US 5712214, at column 5, lines 16-17).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Wettling by heating the adsorbent/polymer slurry under conditions of reduced pressure as taught by Ishikawa so as to effect a better separation and removal of the halogen component from the crude polyolefin.

8. With respect to claims 2-4, Ishikawa discloses a process for the refining of hydrocarbon polymers obtained by polymerization with a Friedel-Crafts type catalyst (see Ishikawa, column 2, lines 22-34).

9. With respect to claim 5, Ishikawa discloses the use of silicates to remove polymerization catalyst impurities (see Ishikawa, column 2, lines 30-32). In addition, Wettling discloses the use of an aluminum oxide as an adsorbent (deactivator) to deactivate a boron trifluoride catalyst (see Wettling, paragraphs 42-44). Magnesium silicate is an art-recognized substitute for aluminum oxide as an adsorbent.

10. With respect to claims 6 and 7, Ishikawa discloses the heating of polymer solution under conditions of reduced pressure for a given duration (see Ishikawa, column 5, lines 17-18).

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11. With respect to claim 8, Ishikawa discloses the use of a silicate to remove polymerization catalyst impurities (see Ishikawa, column 2, lines 22-34) employed at a level greater than 0.4 eq. metal/eq. halogen (see Ishikawa, column 2, lines 59-66).

12. With respect to claim 9, Wettling discloses the separation of catalyst adsorbent (deactivator) from an organic slurry phase (see Wettling, page 5, paragraph 75).

13. With respect to claim 10, the prior art discloses the removal of Friedel-Crafts type catalyst impurities from a crude polyolefin polymerized in the presence of such catalyst whereby the crude polyolefin is washed with water (see Wettling, page 4, paragraph 62), the aqueous and organic phases are separated (see Wettling, page 4, paragraph 62), a silicate is added to the organic phase to form a slurry (see Ishikawa, column 5, lines 8-9), the slurry is heated under reduced pressure (see Ishikawa, column 5, lines 17-18), and the silicate is separated from the slurry (see Ishikawa, column 5, line 17).

14. With respect to claim 11, Wettling discloses a process for catalyst deactivation of a crude polyolefin polymerized in the presence of a boron trifluoride catalyst whereby the crude polyolefin is washed with water (see Wettling, page 4, paragraph 62), the aqueous and organic phases are separated (see Wettling, page 4, paragraph 62), an aluminum oxide adsorbent (deactivator) is added to the organic phase to form a slurry (see Wettling, page 4, paragraph 54), the slurry is heated (see Wettling, page 5, paragraph 75), and the adsorbent is separated from the organic phase (see Wettling, page 5, paragraph 75).

Wettling does not disclose a process step for heating the slurry solution under

reduced pressure, or wherein the adsorbent used is selected from the group consisting of magnesium silicates, calcium silicates, and aluminum silicates.

However, Ishikawa discloses a process of eliminating an aluminum chloride polymerization catalyst from polymerization products whereby sodium silicate is brought into contact with a crude polymer solution and heated under conditions of reduced pressure so as to reduce the halogen content of such solution (see Ishikawa, column 5, lines 16-18). Furthermore, it is known in the art that a stripping operation to remove halogen impurities can be enhanced by carrying out such operation at conditions of reduced pressure (see, e.g., Huang, US 5712214, at column 5, lines 16-17). Finally, magnesium silicates, calcium silicates, and aluminum silicates are all art-recognized substitutes for aluminum oxide as an adsorbent.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Wettling by heating the adsorbent/polymer slurry under conditions of reduced pressure as taught by Ishikawa so as to effect a better separation and removal of the halogen component from the crude polyolefin.

15. With respect to claims 12-14, Ishikawa discloses a process for the refining of hydrocarbon polymers obtained by polymerization with a Friedel-Crafts type catalyst (see Ishikawa, column 2, lines 22-34).

16. With respect to claim 15, Ishikawa discloses the use of silicates to remove polymerization catalyst impurities (see Ishikawa, column 2, lines 30-32). In addition, Wettling discloses the use of an aluminum oxide as an adsorbent (deactivator) to

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deactivate a boron trifluoride catalyst (see Wettling, paragraphs 42-44). Magnesium silicate is an art-recognized substitute for aluminum oxide as an adsorbent.

17. With respect to claims 16 and 17, Ishikawa discloses the heating of polymer solution under conditions of reduced pressure for a given duration (see Ishikawa, column 5, lines 17-18).

18. With respect to claim 18, Ishikawa discloses the use of a silicate to remove polymerization catalyst impurities (see Ishikawa, column 2, lines 22-34) employed at a level greater than 0.4 eq. metal/eq. halogen (see Ishikawa, column 2, lines 59-66).

19. With respect to claim 19, Wettling discloses the separation of catalyst adsorbent (deactivator) from an organic slurry phase (see Wettling, page 5, paragraph 75).

With respect to claim 20, Wettling discloses the use of aluminum oxide as an adsorbent (deactivator) (see Wettling, page 3, paragraphs 42-44). Magnesium silicate is an art-recognized substitute for aluminum oxide as an adsorbent (see e.g., Applicant's Specification at page 13, lines 3-7).

20. With respect to claim 20, Wettling discloses the use of an aluminum oxide as an adsorbent (deactivator) to deactivate a boron trifluoride catalyst (see Wettling, paragraphs 42-44). Magnesium silicate is an art-recognized substitute for aluminum oxide as an adsorbent.



***Response to Arguments***

21. Applicant's arguments filed 29 January 2007 have been fully considered, but they are not persuasive.

22. Examiner understands Applicant's principal arguments to be:

- I. Step (D) of the currently claimed invention is not disclosed or suggested by Wettling.
- II. The use of sodium silicate (as taught by Ishikawa) is outside the scope of the present claimed invention.
- III. The heating step provided by Ishikawa does not meet the minimum required temperature of 180°C of the present invention.

23. With respect to Applicant's first argument, step (D) of the present invention provides for "heating the slurry under reduced pressure at a temperature of at least about 180°C for at least about thirty minutes." Applicant argues that Wettling's disclosure (a) does not meet the minimum required temperature of 180°C and (b) takes place under increased pressure, rather than reduced pressure as required by Applicant's invention.

24. Wettling provides disclosure for Applicant's steps (A), (B), (C), and (E) of claim 1 of the present invention. With respect to step (D), Wettling discloses heating the adsorbent (deactivator) – organic phase slurry for 60 minutes to a temperature of 20°C (see Wettling, page 5, paragraph 75). While Wettling does not disclose heating to 180°C, he does provide that the process can be carried out at other (i.e. higher) temperatures than those explicitly disclosed in his specification (see Wettling, page 4, paragraph 58). Finally, Wettling does not provide any disclosure, much less require,

that the process be carried out under increased pressure, i.e. Wettling's process is not limited in any way with respect to pressure.

25. With respect to Applicant's second argument, Examiner does not rely on Ishikawa for purposes of meeting the limitation of Applicant's choice of adsorbent. Rather, Examiner submits that carrying out the process steps of Wettling under the process conditions of Ishikawa would render Applicant's invention obvious to the person having ordinary skill in the art. In this regard, Examiner notes that Wettling provides for use of aluminum oxide as an adsorbent (see Wettling, page 3, paragraphs 42-44), which does meet the limitation of Applicant's choice of adsorbent in step (C) of claim 1.

26. With respect to Applicant's third argument, Ishikawa discloses heating an adsorbent (silicate) – organic phase slurry to 100°C under reduced pressure for 30 minutes (see Ishikawa, column 5, lines 16-18). Examiner acknowledges that Ishikawa does not disclose heating of the slurry to 180°C as provided for in the present invention. However, differences in temperature will generally not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such temperature is critical. See *In re Aller*, 220 F.2d 454, 105 USPQ 233 (CCPA 1955). Examiner submits that it would have been within the common sense knowledge of the person having ordinary skill in the art at the time the invention was made that carrying out the process of Ishikawa at a higher temperature and for a longer period of time would necessarily result in a higher degree of catalyst contaminant removal from the olefin polymer.

***Conclusion***

27. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randy Boyer whose telephone number is (571) 272-7113. The examiner can normally be reached Monday through Friday from 8:00 A.M. to 5:00 P.M.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola, can be reached at (571) 272-1444. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RPB



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